Bibliographic refer nces.

5

10

Ausubel F. M., Brent R., Kinston R. E., Moore D. D., Smith J. A., Seidman J. G. and K. Struhl, 1987. Current protocols in molecular biology 1987-1988. John Wiley and Sons, New York.

Bagdasarian, M., R. Lurz, B. Rückert, F. C. Franklin, M. M. Bagdasarian, J. Frey, and K. Timmis, 1981.

Specific-purpose plasmid cloning vectors. II. Broad host range, high copy number, RSF1010-derived vectors, and a host vector system for gene cloning in Pseudomonas. Gene 16:237-247.

Barrère G., Geneste B., and Sabatier A., 1981.

Fabrication de la vitamine B12: l'amélioration d'un procédé (Manufacture of vitamin B12: improvement of a process). Pour la Science, 49, 56-64.

Battersby A. R., Fookes C. J. R., Matcham G. W. J., and
MacDonald E., 1980. Biosynthesis of the pigments of
life: formation of the macrocycle. Nature, 285, 17-21.

Battersby, A. R., and E. MacDonald, 1982. Biosynthesis of the corrin macrocycle. p. 107-144. In D. Dolphin (ed.), B12, vol. 1. John Wiley & Sons, Inc., New York.

Beck., W.S. 1982. Biological and medical aspects of vitamin B12. p. 1-30. In D. Dolphin (ed.), B12, vol. 1. John Wiley & Sons, Inc., New York.

5 Ben Bassat A., and K. Bauer. 1987. Amino-terminal processing of proteins. Nature, 326:315.

10

Blanche F., L. Debussche, D. Thibaut, J. Crouzet and B. Cameron. 1989. Purification and Characterisation of S-Adenosyl-L-Methionine:Uroporphyrinogen III methyltransferase from <u>Pseudomonas denitrificans</u>.

J. Bacteriol., 171:4222-4231.

Brey R. N., Banner C. D. B., and Wolf J. B., 1986.

Cloning of Multiple Genes Involved with Cobalamin
(Vitamin B12) Biosynthesis in Bacillus megaterium. J.

Bacteriol., 167, 623-630.

Cameron B., K. Briggs, S. Pridmore, G. Brefort and

J. Crouzet, 1989. Cloning and analysis of genes
involved in coenzyme B12 biosynthesis in <u>Pseudomonas</u>
denitrificans. J. Bacteriol, 171, 547-557.

Casadaban, M. J., A. Martinez-Arias, S. T. Shapira and J. Chou. 1983. β -galactosidase gene fusion for analysing gene expression in Escherichia coli and Yeast. Methods Enzymol. 100, 293-308.

De Bruijn F. J. and J. R. Lupski, 1984. The use of transposon Tn5 mutagenesis in the rapid generation of correlated physical and genetic maps of DNA segments cloned into multicopy plasmids - a review. Gene, 27, 131-149.

De Graff, J., J. H. Crosa, F. Heffron, and S. Falkow. 1978. Replication of the nonconjugative plasmid RSF1010 in Escherichia coli K-12. J. Bacteriol. 146, 117-122.

10

15

20

25

5

Denèfle P., S. Kovarik, J.-D. Guiton, T. Cartwright and J.-F. Mayaux. 1987. Chemical synthesis of a gene coding for human angiogenin, its expression in <u>Escherichia</u> coli and conversion of the product into its active form. Gene, 56, 61-70.

Ditta G., Schmidhauser T., Yakobson E., Lu P., Liang X.-W., Finlay D. R., Guiney D. and D. R. Helinski, 1985. Plasmids related to the broad host range vector pRK290, useful for gene cloning and for monitoring gene expression. Plasmid, 13, 149-154.

Ditta, G., S. Stanfield, D. Corbin, and D. R. Helinski, 1980. Broad host range DNA cloning system for Gramnegative bacteria: Construction of a gene library of Rhizobium meliloti. Proc. Natl. Acad. Sci. USA 77, 7347-7351.

Escalante-Semerena J. C. and J.R. Roth, 1987.

Regulation of the cobalamin biosynthetic operons in Salmonella typhimurium. J. Bacteriol, 169, 225-2258.

Florent, J. 1986. Vitamins. pl15-158. In H.-J. Rehm and G. Reed (ed.), Biotechnology, vol. 4, VCH

Verlagsgesellschaft mbH, Weinheim.

Friedmann H. C. and L. M. Cagen, 1970. Microbial biosynthesis of Bl2-like compounds. Ann. Rev. Microbiol., 24, 159-208.

15

Friedmann H. C., 1968. Vitamin B12 biosynthesis. J. Biol. Chem., 243, 2065-2075.

Friedmann H. C., 1975. Biosynthesis of corrinoids. In Babior B. M., Cobalamin, 75-110, John Wiley and Sons, New York.

20 Henikoff S. 1984. Unidirectional digestion with exonuclease III creates targeted breakpoints for DNA sequencing. Gene, 28, 351-359.

Hirel Ph-H, J.-M. Schmitter, P. Dessen and S. Blanquet.

1989. Extent of N-terminal methionine excision within

E. coli proteins is governed by the side chain of the

penultimate aminoacids. Proc. Natl. Acad. USA, in press.

Hopp T.P. and K. R. Woods, 1981. Prediction of protein antigenic determinants from amino acids sequences.

Proc. Natl. Acad. Sci. USA, 78,3824-3828.

Huennekens F. M., Vitols K. S., Fujii K. and Jacobsen D. W., 1982. Biosynthesis of cobalamin coenzyme. In Dolphin D., B12, vol. 1, 145-167, John Wiley & Sons, New York.

Irion R. and Ljungdahl L. G., 1965. Isolation of factor
IIIm coenzyme and cobyric acid coenzyme plus other B12
factors from Clostridium thermoaceticum. Biochemistry,
4, 2780-2790.

Jeter R. M., Olivera B. M. and Roth J. R., 1984.

Salmonella typhimurium synthesises cobalamin (vitamin

Bl2) de novo under anaerobic growth conditions.

J. Bacteriol., 159, 206-213.

Jeter, R. M. and J. R. Roth, 1987. Cobalamin (Vitamin B12) Biosynthetic Genes of Salmonella typhimurium.

25 J. Bacteriol. 169, 3189-3198.

Jorgensen R. A., Rothstein S. J. and Reznikoff W. R., 1979. A restriction enzyme cleavage map of Tn₅ and location of a region encoding neomycin resistance.

Molec. Gen. Genet., 177, 65-62.

5

10

Kanangara C. G., S. P. Gough, P. Bruyant, J. K. Hoober,
A. Kahn and D. von Wettstein, 1988. tRNA^{Glu} as a cofactor
in d-aminolevulinate biosynthesis: steps that regulate
chlorophyll synthesis. Trends in Biochem. Sci., 139143.

Kanehisa M. 1984. Use of statistical criteria for screening potential homologies in nucleic acids sequences. Nucleic Acids Res., 12:203-215.

15

Kieny M. P., R. Lathe and J.P. Lecocq. 1983. New versatile cloning vectors based on bacteriophage M13. Gene, 26, 91-99.

- 20 Krzycki J. and J. G. Zeikus. Quantification of corrinoids in methanogenic bacteria. 1980. Curr. Microbiol., 3, 243-245.
- L. Skatrud, A. J. Tietz, T. D. Ingolia, C. A. Cantwell,
 D. L. Fisher, J. L. Chapman and S. W. Queener. 1989.
 Use of recombinant DNA to improve production of

L. Skatrud, A. J. Tietz, T. D. Ingolia, C. A. Cantwell, D. L. Fisher, J. L. Chapman and S. W. Queener. 1989.

Use of recombinant DNA to improve production of cephalosporin C by Cephalosporium acremonium.

5 Bio/Technology, 1989, 7, 477-485.

Laemli U. K., 1970. Cleavage of structural proteins during the assembly of the head of bacteriophage T4. Nature, 227, 680-685.

10

Leong S. A., Ditta G. S., Helinski D. R., 1982. Haem Biosynthesis in Rhizobium. Identification of a cloned gene coding for d-aminolevulinic acid synthetase from Rhizobium meliloti. J. Biol. Chem., 257, 8724-8730.

15

Macdonald H. and J. Cole. Molecular cloning and functional analysis of the cysG and nirB genes of E. coli K12, Two closely-linked genes required for NADH-dependent reductase activity. Submitted to publication.

20

Maniatis, T., E. F. Fritsch, and J. Sambrook, 1982.

Molecular cloning: a laboratory manual. Cold Spring

Harbor Laboratory, Cold Spring Harbor, New York.

Mazumder T.K., N. Nishio, M. Hayashi and S. Nagai, 1987. Production of corrinoids including vitamin by Methanosarcina barkeri. 1986. Biotechnol. Letters, 12, 843:848.

5

Mazumder T. K., N. Nishio, S. Fukazaki and S. Nagai.

1987. Production of Extracellular vitamin B12 compounds
from methanol by Methanosarcina barkeri. Appl.

Microbiol. Biotechnol., 26, 511-516.

10

Miller, J. H. 1972. Experiment in molecular genetics.

Cold Spring Harbor Laboratory, Cold Spring Harbor, New

York.

Monod J. and E. Wollman. 1947. Inhibition de la croissance et de l'adaptation enzymatique chez les bactéries infectées par le bactériophage (Inhibition of growth and of enzymatic adaptation in bacteria infected with bacteriophage). Ann. Inst. Pasteur, 73, 937-956.

20

Murphy M. J., Siegel L. M, Kamin H. and Rosenthal D., 1973. Identification of a new class of haem prosthetic group: an iron-tetrahydroporphyrin (isobacteriochlorin type) with eight carboxylic acid groups. J. Biol.

25 Chem., 248, 2801-2814.

Murphy M. J., Siegel L. M., 1973. The basis for a new type of porphyrin-related prosthetic group common to both assimilatory and dissimilatory sulfite reductases.

J. Biol. Chem., 248, 6911-6919.

5

15

Nexo E. and Olesen H., 1982. Intrinsic factor, transcobalamin and haptocorrin. In Dolphin D., B12, 57-85, John Wiley & Sons, New York.

Normark S., S. Bergtröm, T. Edlund, T. Grundström, B. Jaurin, F. Lindberg and O. Olsson. 1983. Overlapping genes. Ann. Rev. Genet., 17, 499-525.

Norrander J., T. Kempe and J. Messing. 1983.

Construction of improved M13 vectors using oligodeoxynucleotide-directed mutagenesis. Gene 26, 101-106.

Noyes R., 1970. Vitamin B12 manufacture, 145-182, Noyes

Prentki P. and H. M. Krisch. 1984. <u>In vitro</u> insertional mutagenesis with a selectable DNA fragment. Gene, 29, 303-313.

developpement S.A., Park Ridge, N. J., USA.

Renz P. 1970. Some intermediates in the biosynthesis of vitamin B_{12} . Methods in Enzymol., 18, 82-92.

Rigby P. W. J., Dieckmann M., Rhodes C., Berg P., 1977.

Labeling deoxyribonucleic acid to high specific activity in vitro by nick translation with DNA polymerase I. J. Mol. Biol., 113, 237.

5

Roof D. M. and J. R. Roth. 1988. Ethanolamine utilization in Salmonella typhimurium. J. Bacteriol., 170, 3855-3863.

Sanger F., S. Nicklen and A. R. Coulson. 1977. DNA sequencing with chain-terminating inhibitors. Proc. Natl. Acad. Sci., 74, 5463-5468.

Saunders G., Tuite M. F. and Holt G., 1986. Fungal cloning vectors. Trends Biotechnol., 4, 93-98.

Scherer P., Höllriegel V., Krug C., Bokel M. and Renz P., 1984. On the biosynthesis of 5hydroxybenzimidazolylcobamide (vitamin Bl2-factor III)
in Methanosarcina barkeri. Arch. Microbiol., 138, 354359.

Schneider Z. and Friedmann H., 1972. Studies on enzymatic dephosphorylation of vitamin B12 5'
phosphate. Arch. Biochem. Biophys., 152, 488-495.

Scott A. I., N. E. Mackenzie, P. J. Santander,
P. E. Fagerness, G. Muller, E. Schneider, R. Seldmeier
and G. Worner, 1984. Biosynthesis of vitamin B12-Timing
of the methylation steps between uro'gen III and
cobyrinic acid. Bioorg. Chem. 12:356-352.

Southern E., 1975. Detection of specific sequences among DNA fragments separated by gel electrophoresis.

J. Mol.Biol., 98, 503-517.

10

5

Stachel S. E., G. An, C. Flores and E. W. Nester, 1985. a Tn31ac2 transposon for the random generation of β -galactosidase gene fusions: application to the analysis of gene expression in Agrobacterium. Embo J., 4, 891-898.

15 4, 891-898.

Staden R. and A. D. McLachlan, 1982. Codon preference and its use in identifying protein coding regions in long DNA sequences. Nucleic Acid Res., 10, 141-156.

20

Stupperich E., I.Steiner and H. J. Eisinger, 1987.

Substitution of Coa-(5-Hydroxybenzimidazoly1)Cobamide

(Factor III) by vitamin B12 in Methanobacterium

thermoautotrophicum. J. Bacteriol., 169:3076-3081.

Taylor J. W., J.Ott and F. Eckstein, 1985. The rapid generation of oligonucleotide-directed mutations at high frequency using phophorothioate-modified DNA.

Nucl. Acid Res., 13, 8764-8765.

5

Viera J. and Messing J., 1982. The pUC plasmids, an M13mp7-derived system for insertion mutagenesis and sequencing with synthetic universal primers. Gene, 19, 259-268.

10

Wein-Hsiung L., L. Chi-Cheng and W. Chung-I. 1985.

Evolution of DNA sequences. p 1-94. In R. J. MacIntyre (ed.), Molecular Evolutionary genetics. Plenum Press, New York and London.

15

20

Latta, M., M. Philit, I. Maury, F. Soubrier, P. Denèfle and J.-F. Mayaux. 1990. Tryptophan promoter derivatives on multicopy plasmids: a comparative analysis of the expression potentials en Escherichia coli. DNA Cell Biol., 9, 129-137.

Mayaux, J.-F., E. Cerbelaud, F. Soubrier, D. Faucher and D. Pétré. 1990. Purification, cloning and primary structure of an enantio-selective amidase from

Brevibacterium sp. R312. Structural evidence for a genetic coupling with nitrile-hydratase. 1990. J.

Bacteriol., 172, 6764-6773.

Belyaev, S. S., R. Wolkin, W. R. Kenealy, M. J. De Niro, M. J. Epstein and J. G. Zeikus. 1983.

Methanogenic bacteria from Bondyuzhskoe oil field: general characterization and analysis of stable-carbon isotopic fractionation. Appl. Environ. Microbiol., 45, 691-697.

Saiki, R. K., D. H. Gelfand, S. Stoffel, S. Scharf, R. Higuchi, G. T. Horn, K. B. Mullis and H. A. Erlich.

1988. Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. Science, 239, 487-491.

Souillard, N., M. Magot, O. Possot and L. Sibold. 1988.

Nucleotide sequence of regions homologous to NifH

(nitrogenase Fe protein) from the nitrogen fixing

archaebacteria Methanococcus thermolithotrophicum and

Methanobacterium ivanovi : evolutionary implications.

J. Mol. Evol., 2, 65-76.

20

5

Chen, E. L. and P. H. Seeburg. 1985. Supercoil sequencing: a fast and simple method for sequencing plasmid DNA. DNA, 4, 165-170.

Saiki R. K., D. H. Gelfand, S. Stoffel, S. J. Scharf, R. Higuchi, G. T. Horn, K. B. Mullis and H. Erlich.

1988. Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. Science, 239, 487-491.

Grunstein M., Hogness D., 1975. Colony hybridisation: a method for the isolation of cloned DNAs that contains a specific gene. Proc. Natl. Acad. Sci. USA, 72, 3961-3971.

Cossart, P. and B. Gicquel-Sanzey. 1982. Cloning and sequence of the <u>crp</u> gene of <u>Escherichia coli</u> K 12. Nucleic Accid Res., 10, 1363-1378.

15

10

5

Viera, J. and J. Messing, 1987. Production of single stranded plasmid DNA. Meth. Enzymol., 153, 3-11.

Barbieri P. G., Boretti A., Di Marco A., Migliacci A.,
and Spalla C. 1962. Further observations on the
biosynthesis of vitamin B12 in Nocardia rugosa.
Biochim. Biophys. Acta., 57, 599-600.

Renz P. 1968. Reaktionfolge der enzymatischen synthese
von vitamin B12 aus cobinamid bei Propionibacterium
shermanii. Z. Physiol. Chem., 349, 979-981.

Ronzio R. A., and Barker H. A. 1967. Enzimic synthesis of guanosine diphosphate cobinamide by extracts of propionic acid bacteria. Biochemistry, 6, 2244-2354.

Thibaut D., Debussche L., and Blanche F. 1990.

Biosynthesis of vitamin B12: Isolation of precorrin-6x,
a metal-free precursor of the corrin macrocycle
retaining five S-adenosylmethionine-derived peripheral
methyl groups. Proc. Natl. Acad. Sci., 87, 8795-8799.

Ohta H., and Beck W. S. 1976. Studies of the ribosomeassociated vitamin B12s adenosylating enzyme of Lactobacillus leichmannii. Arch. Biochem. Biophys.,

174, 713-725.

Brady R. O., Castanera E. G., and Barker H. A. 1962.

The enzymatic synthesis of cobamide coenzymes. J. Biol.

Chem., 237, 2325-2332.

Fenton W. A., and Rosenberg L. E. 1978. Mitochondrial metabolism of hydroxocobalamin: synthesis of adenosylcobalamin by intact rat liver mitochondria.

Arch. Biochem. Biophys., 189, 441-447.

10

15

Vitols E., Walker G. A., and Huennekens F. M. 1966. Enzymatic conversion of vitamin B12s to a cobamide coenzyme, α -(5,6-dimethyl-benzimidazolyl) deoxyadenosylcobamide (Adenosyl-B12). J. Biol. Chem. 241, 1455-1461.

Gimsing P., and Beck W. S. 1986. Determination of cobalamins in biological material. Methods Enzymol., 123, 3-14.

10

5

Jacobsen W. J., Green R., and Brown K. L. 1986.

Analysis of cobalamin coenzymes and other corrinoids by high-performance liquid chromatography. Methods